भारतीय मानक
Indian Standard

IS 17854 : 2022

प्रबलित चावल के उत्पादन हेतु उपकरण — विशिष्टि

Equipment for Manufacture of Fortified Rice — Specification

ICS 67.260

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

January 2022 **Price Group 3**

Agriculture and Food Processing Equipment Sectional Committee, FAD 20

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Agriculture and Food Processing Equipment Sectional Committee had been approved by the Food and Agriculture Division Council.

Fortified rice kernels (FRK) are rice grains fortified with micronutrient premix. The micronutrient premix is added to rice-based carrier to form fortified rice kernels using two technologies namely, extrusion and coating. Fortified kernels are blended with non-fortified rice in a ratio of 1 percent or 2 percent to produce fortified rice. In order to overcome micronutrient deficiencies in Indian population, Government of India is promoting consumption of fortified rice containing iron, folic acid and vitamin B_{12}, through various social security programmes like Public Distribution System (PDS), Integrated Child Development Scheme (ICDS), and Mid-Day Meal Scheme (PM Poshan) in Schools.

In order to strengthen the rice fortification ecosystem in the country, BIS has taken up formulation of Indian Standards on specifications for fortified rice and related commodities as well as equipment and machinery used for their manufacture to ensure consistent quality of final products. In this regard, three Indian Standards on specifications for fortified rice and related commodities have been published which are as under:

IS 17780 : 2021 Fortified rice — Specification

IS 17781 : 2021 Vitamin mineral premix for manufacturing fortified rice kernels — Specification

IS 17782 : 2021 Fortified rice kernels — Specification

This standard covers the specification for machinery used for production of fortified rice through blending of fortified kernels and rice kernels. The machinery covered in this standard are continuous type and batch type.

Another Indian Standard, IS 17853 : 2022 ‘Equipment for manufacture of fortified rice kernel — Specification’ has also been formulated covering the specification for equipment used for manufacture of Fortified rice kernel.

The composition of the Committee responsible for formulation of the standard is given at Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

EQUIPMENT FOR MANUFACTURE OF FORTIFIED RICE — SPECIFICATION

1 SCOPE

This standard prescribes the requirements of blending unit and its types used for manufacture of fortified rice.

2 REFERENCES

The standards listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below:

IS No.	*Title*
6911 : 2017	Stainless steel plate, sheet and strip — Specification (*second revision*)
7283 : 1995	Hot-rolled bars for the production of bright bars and machined parts for engineering applications — Specification (*first revision*)
17780 : 2021	Fortified rice — Specification

3 TERMINOLOGY

For the purpose of this standard, the following terms and their definitions and terms shall apply.

3.1 Fortification — Practice of deliberately increasing the content of essential micronutrient(s), that is vitamins and minerals, in a food, so as to improve the nutritional quality of the food supply and provide a public health benefit with minimal risk to health. The essential micronutrients are added to make the food more nutritious post-harvesting. Fortification is synonymous with enrichment, and is irrespective of whether the nutrients were originally in the food before processing or not.

3.2 Fortified Rice Kernels (FRK) — Rice shaped kernels containing vitamins and minerals through extrusion or whole rice kernels coated with vitamins and minerals.

3.3 Fortified Rice (FR) — Blend of FRK and polished raw or parboiled rice in the ratio of 1 : 100 or 2 : 100 with a tolerance limit of ± 10 percent of the declared ratio.

3.4 Blending — Uniform mixing of one material with other in a certain ratio such that after mixing the output is homogenous in nature.

4 CONSTRUCTIONAL REQUIREMENTS

4.1 Blending Unit

Blending unit shall be batch or continuous type depending upon the capacity and requirement. Blender may be of the following types:

a) Continuous screw/ribbon blender;
b) Drum blender;
c) Continuous drum blender;
d) Paddle blender; and
e) Octagonal blender.

4.1.1 *Components of Blending Unit*

4.1.1.1 The blending unit shall contain the hopper, lid and screw/ribbon/paddle of suitable capacity.

4.1.1.2 The blending unit shall contain agitator capable of uniform mixing. The agitator should not damage FRK and raw rice.

4.1.1.3 Blender shall be provided with a magnet to trap metal impurities.

4.1.1.4 Suitable size of electric motor shall be installed to provide required rpm to operate Blender.

4.1.2 *Control System*

4.1.2.1 The control system used shall be capable of feeding the FRK and rice at a predefined rate. The feeding rate shall be declared by the manufacturer.

4.1.2.2 The blending unit shall have control system for FRK feeding, rice feeding and mixer with LCD/LED/HMI screen to control process parameters.

It may also have supervisory control and data acquisition (SCADA) system to record FRK and rice feed rate, output capacity, etc.

5 PERFORMANCE REQUIREMENT

5.1 The output of blending unit (FRK : rice) shall be in a ratio of 1 : 100 or 2 : 100. This shall be confirmed/verified at periodic interval through appropriate procedures.

5.2 The output of blending unit shall be free from metal or other foreign impurities.

5.3 The output should be such as to produce FR as per IS 17780.

6 MATERIAL OF CONSTRUCTION

The material for components shall be as given in Table 1.

7 MARKING

Each equipment shall be legibly and indelibly marked with the following particulars:

a) Manufacturer's name or recognized trademark, if any;
b) Batch or serial number and date of manufacture;
c) Nominal capacity;
d) Material of construction and their grade for different components; and
e) Proper Safety signs.

8 BIS CERTIFICATION MARKING

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

Table 1 Material of Construction

(*Clause* 6)

Sl No.	Component	Grade of Material	Conforming to Indian Standard
i)	Hopper	Stainless steel grade X04Cr19Ni9	IS 6911
ii)	Lid	Stainless steel grade X04Cr19Ni9	IS 6911
iii)	Screw/ribbon	Stainless steel grade X04Cr19Ni9	IS 7283
iv)	Paddle	Stainless steel grade X04Cr19Ni9	IS 6911
v)	Containers	Stainless steel grade X04Cr19Ni9	IS 6911
vi)	Agitator	Stainless steel grade X04Cr19Ni9	IS 6911

NOTES

1 Other materials for different components may also be used subject to agreement between the manufacturer and purchaser, and the same shall be declare by the manufacturer.

2 For continuous operations suitable conveying system shall be provided with food grade material wherever the FRK, fortified rice and rice are in contact.

3 Schematic of manufacturing process of fortified rice is given in Fig. 1.

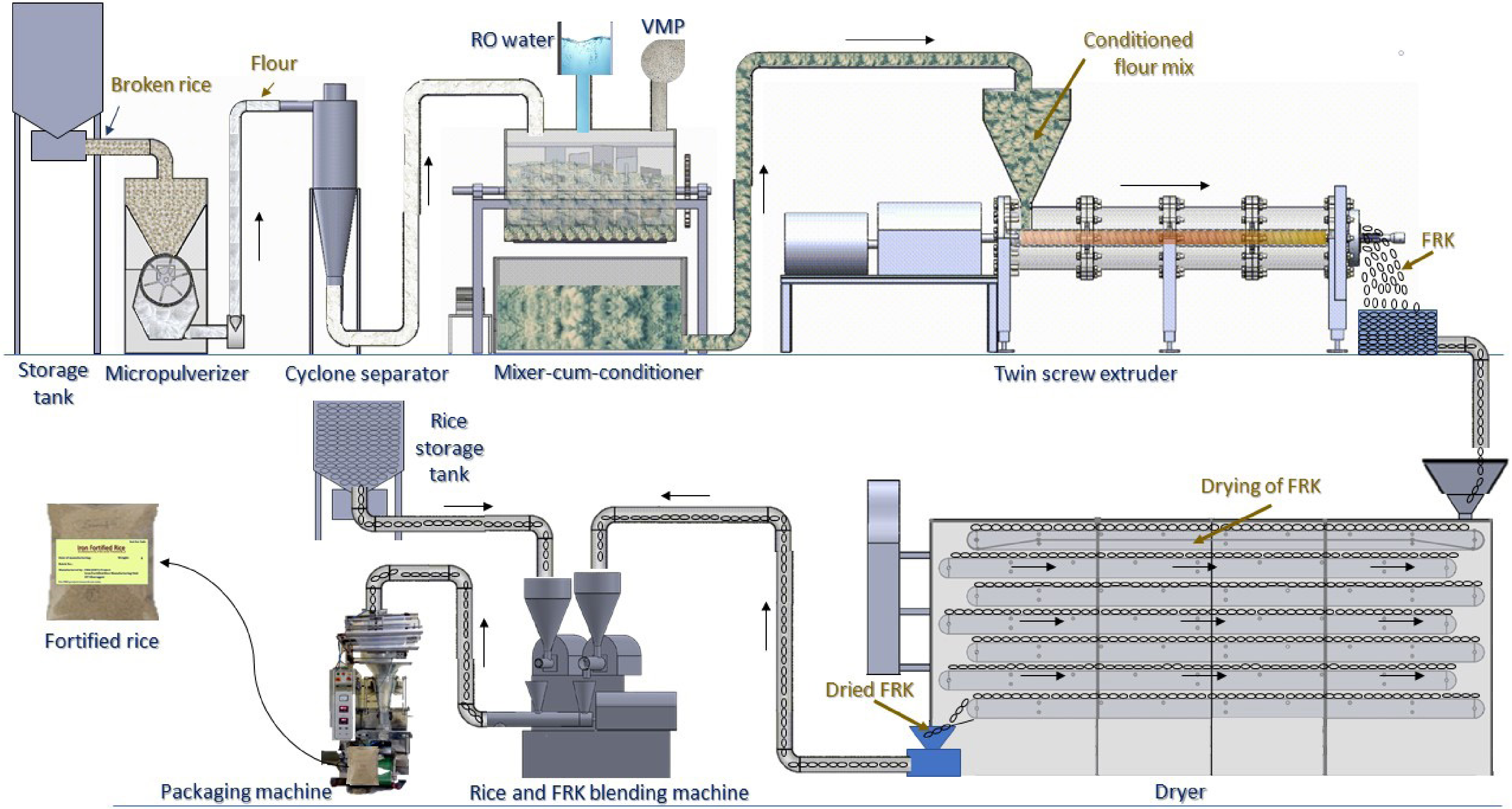

Fig.1 Process Flow Chart for Continuous Manufacturing of FRK and Fortified Rice

ANNEX D

(*Foreword*)

COMMITTEE COMPOSITION

Agriculture and Food Processing Equipments Sectional Committee, FAD 20

Organization	*Representative(s)*
In Personal Capacity, Tiruchivappalli	Dr K. Alagusundaram (***Chairman***)
Agriculture Machinery Manufacturers Association, Pune	Dr Surendra Singh Shri Kashinathsa V. Kabadi (*Alternate*)
CCS Haryana Agricultural University, Hisar	Dr Ravi Gupta
Essen Multipack Limited, Rajkot	Shri Shaildip Wagh
ICAR-Indian Institute of Horticultural Research, Bengaluru	Dr A. Carolina Rathina Kumar Dr S. Bhuaneswari (*Alternate*)
ICAR-Central Institute of Agricultural Engineering, Bhopal	Dr S. K. Giri Dr Ravindra Naik (*Alternate*)
ICAR-Central Institute for Research on Cotton Technology, Mumbai	Dr V. G. Arude
ICAR-Central Institute of Post-Harvest Engineering and Technology, Ludhiana	Dr Sandeep Mann Dr R. K. Vishwakarma (*Alternate*)
Indian Council of Agricultural Research, New Delhi	Dr Panna Lal Singh Dr Kanchan K. Singh (*Alternate*)
Indian Institute of Food Processing Technology, Thanjavur	Dr S. Bhuvana
Indosaw Industrial Products Private Limited, Ambala Cantt	Dr V. H. Kalbande
Ministry of Agriculture, Department of Agriculture, New Delhi	Shri C. R. Lohi Shri P. K. Chopra (*Alternate*)
National Committee on Plasticulture Applications in Horticulture, New Delhi	Shri Anand Zambre
National Institute of Food Technology Entrepreneurship and Management, Sonipat	Dr P. K. Nema
Northern Region Farm Machinery Training and Testing Institute, Hisar	Shri Mukesh Jain
Osaw Agro Industries Private Limited, Ambala	Shri Jagdish Singh
Tamil Nadu Agricultural University, Coimbatore	Dr R. Thirupathi Dr P. Rajkumar (*Alternate* I) Dr P. Sudha (*Alternate* II)
In Personal Capacity, New Delhi	Shri Pitam Chandra
In Personal Capacity, Bhopal	Shri S. D. Deshpande
In Personal Capacity, Bengaluru	Shri Jix Antony
In Personal Capacity, Coimbatore	Shri R. Viswanathan
BIS Directorate General	Shrimati Suneeti Toteja, Scientist 'E' and Head (FAD) [Representing Director General (*Ex-officio*)]

Member Secretary

Shri Pawan Kumar
Scientist 'C' (FAD), BIS

Panel on Development of Standard on Extruder and Blender for Manufacturing FRK/Fortified Rice, FAD 20/P-14

Organization	*Representative(s)*
Indian Institute of Technology Kharagpur, Kharagpur	Dr H. N. Mishra (***Convener)***
Bihariji Agro Foods Private Limited (BAFPL), New Delhi	Shri Brijesh Gupta
Food Corporation of India (FCI), New Delhi	Shri Gautam Kumar
Food Fortification Resource Centre, New Delhi	Shri Vivek Arora
ICAR-Central Institute of Post-Harvest Engineering & Technology, Ludhiana	Shri Mridula Devi
Indian Institute of Technology Kharagpur, Kharagpur	Dr Chandrakant Genu Dalbhagat
JVS Foods Private Limited, Jaipur	Shri Vivek Lodha
Nutrition International India, New Delhi	Ms Sakshi Jain
Program for Appropriate Technology in Health (PATH), New Delhi	Ms Rohini Saran
Tamil Nadu Agricultural University, Coimbatore	Dr S. Ganapathy
World Food Program (WFP), New Delhi	Dr Shariqua Yunus Khan

Bureau of Indian Standards

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	2337 8499, 2337 8561 2337 8626, 2337 9120
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